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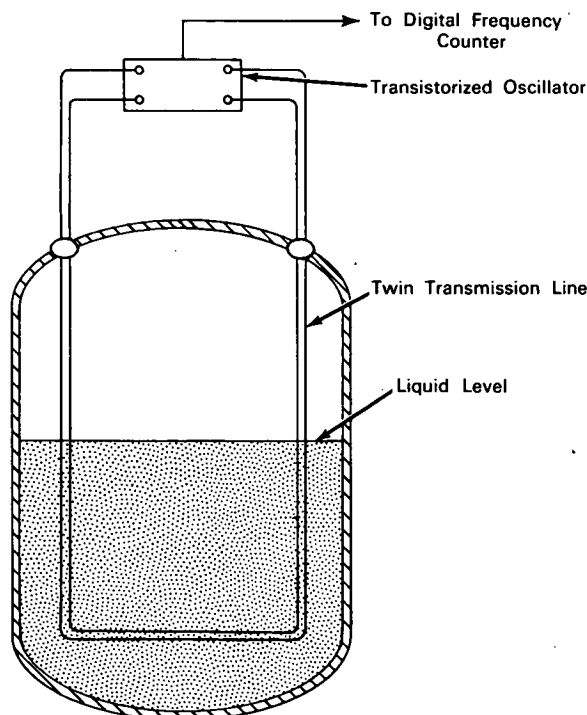
Brief 65-10209

# NASA TECH BRIEF



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## Oscillator Circuit Measures Liquid Level in Tanks



**The problem:** Accurately measuring the level of a liquid in a tank by electronic means. The measurement system must operate automatically without moving parts and provide an output signal of liquid level that can be transmitted to a remote recorder.

**The solution:** An oscillator circuit employing a twin transmission line as a liquid level probe.

**How it's done:** A continuous loop of twin transmission line extending through the liquid in the tank is connected to a transistorized 5-mc oscillator. The

oscillation frequency of this resonant circuit for a liquid of given dielectric constant is directly proportional to the level (depth) of liquid in the tank. Since the system losses are only a few db in this relatively low-frequency system, the oscillation frequency is almost totally determined by line length rather than transistor characteristics, resulting in excellent frequency stability. A conventional 10-mc digital counter connected to the oscillator circuit is used to provide a readout of the oscillation frequency, which in turn is a direct measure of the liquid level.

**Notes:**

1. The separation between the two legs of the loop must be at least ten times the spacing between the twin conductors comprising the line in order to minimize coupling effects.
2. Instead of using a continuous loop of twin transmission line, one leg of line terminated in an open circuit at the bottom of the tank may be used. This arrangement, however, may produce large errors because of signal reflections from the surface of the liquid and the tank bottom.

3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Huntsville, Alabama, 35812  
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**Patent status:** NASA encourages the immediate use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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